



APPENDIX B

PLANNING TOOLS



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Planning Tools

Evaluating Slope

Slope is the steepness of the land expressed as the amount (in percent) of vertical rise or fall per 100 feet of horizontal distance. For example, a 5% slope means a five-foot change in elevation per 100 feet of horizontal distance.

Slope, along with soil texture (sand, loam, and clay) and ground cover, determines how fast water will drain from an area. Water drains quickly from steep slopes and erosion may be a problem. Flat surfaces may result in saturated soils. Slope can and should be managed during road design and layout.



Slope can be divided into three broad categories: *flat*, *moderate* and *steep*. Standing downhill, and facing uphill, try to look level back into the hill. To help keep your line of site level, face uphill with your arm stretched out in front of you with a pencil pointing up out of your fist. Looking over the tip of the pencil will keep your site level. Estimate the horizontal distance between you and the point at which your site line hits the ground. Divide the height distance by horizontal distance to determine the percent of slope. Instruments that are readily available to measure slope with increased accuracy are an Abney Level, a clinometer, or a slope gauge.

Information on slope may also be obtained by using:

- USGS Topographic Maps
- Soil Surveys
- Soil Maps

Evaluation of Aerial Photographs

Aerial photographs or “maps” are high altitude photos taken in a very concise and systematic manner. Although aerial photos can be made in color and even in infrared imagery, the most commonly used aerial photos are black and white. Generally, the top of the photograph is north.

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Information that can be delineated from aerial photographs is:

- Boundaries and timber types (for example, pines appear darker than hardwoods);
- Drainage patterns and streams;
- Roads, buildings and other areas of special interest; and
- Elevational changes if stereoscopic coverage is available.

Aerial photographs come in many scales such as 1"=660', 1320', 2000', etc. It is very important that the individual using the photographs know the scale of the photograph so that the information will be accurate.



Aerial photographs are available from:

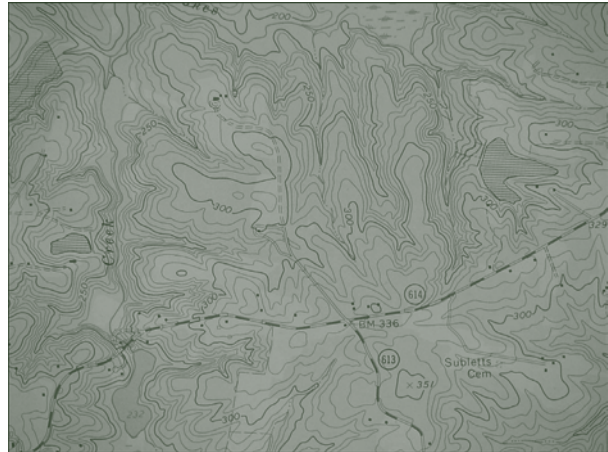
Natural Resources Conservation Service
Farm Services Agency
Virginia Department of Forestry Field Offices
Virginia Department of Transportation District Offices
Private vendors

Evaluation of Soil Maps

Soil maps are aerial photographs on which the soil types are delineated. Soils are classified, mapped, and ground truthed. They are published by the Natural Resources Conservation Service in a book called *A Soil Survey*, which can be obtained at your local NRCS office for most localities in Virginia.

Soil maps are excellent planning tools, especially in the coastal plain region of Virginia. They are very useful for:

1. Planning tract entry and operational routes;
2. Avoiding problem areas such as wet areas;
3. Planning for stream crossing locations;
4. Estimating difficult slopes that may be encountered; and
5. Determination of drainage patterns.



Topographic Map

Topographic maps, or "quad sheets," are printed maps that portray the relief of the landscape and display physical features such as roads, buildings, and perennial and intermittent streams.

Changes in elevation are shown by a series of contour interval lines. These lines represent a point's elevation above sea level. Any point along a line is the same elevation as any other point on the same line. The closer the contour lines are to each other, the steeper the slope. The elevation distance between the lines is usually 5 or 10 feet, and can be 20 or 40 feet in the mountains. The information is given at the bottom center of the map. The elevation is frequently printed along several of the contour lines.

Evaluation of Drainage Area

Drainage area, or watershed, is the total number of acres that drain to a common point in a stream channel, such as a culvert, creek crossing, or bridge. Determining the acreage in the watershed is important in sizing culverts, locating stream crossings, or locating bridges.

The use of topographic maps is critical in determining a watershed area. The topo maps show changes in elevation by a series of contour lines. These lines can be used to determine which slopes drain through an area. To determine the watershed, it is helpful to remember two things:

1. On hilltops, contour lines will form a small, rough circular shape.
2. On contour lines with fingerlike projections, which identify the stream flow, the fingers point uphill.

The watershed can be defined by drawing arrows in the direction of drainage to the common point. After the watershed is drawn, the number of acres in the area can be estimated. For a topographic map with a scale of 1:24,000 (a 7.5 minute map), Table 14 can be used as a quick guide.

Table 14 Guide for Area Estimation on a 7.5 Minute Topographic Map	
Shape	Acres
Head of a pencil eraser	5
Dime	40
Nickel	50
Quarter	70
1"x1" square	90

[illegible]



This image shows a blank sheet of white paper with horizontal blue or grey ruling lines. A single vertical line runs down the left side, creating a margin. The paper appears to be part of a notebook or a template for writing. There are no markings, text, or illustrations on the page.